DEFENCE R&D DÉFENSE

NATO Performance Assessment Questionnaire (PAQ) Database

J L. Colwell

Defence R&D Canada
Technical Memorandum
DREA TM 2001-151
September 2001

National Defence Défense nationale

Canada

P516767.PDF [Page: 4 of 36]

104-06935/

NATO Performance Assessment Questionnaire (PAQ) Database

J.L. Colwell

Defence Research Establishment Atlantic

Technical Memorandum

DREA TM 2001-151

September 2001

Author

J.L. Colwell

Approved By

J.L. Kennedy

Head, Warship Signatures and Safety Section

Approved for Release By:

K. Foster

Chair, DREA Document Review Panel

© Her Majesty the Queen as represented by the Minister of National Defence, 2001

© Sa majesté la reine, représentée par le ministre de la Défense nationale, 2001

Abstract

The NATO Performance Assessment Questionnaire (PAQ) was developed to obtain a large database on fatigue, motion sickness and task performance problems associated with ship motions in the naval environment. The PAQ was deployed on seven ships of the NATO Standing Naval Forces Atlantic fleet (STANAVFORLANT), during North Atlantic combat exercises in February and March of 1997. The resulting PAQ database contains over 16,500 completions of the 41-parameter 'Symptoms' and 'Performance' sections of the PAQ. This Technical Memorandum documents the contents and format of the PAQ database and related files, version 1.

Résumé

Le questionnaire d'évaluation de performance (QEP) de l'OTAN a été conçu pour dresser une base de données sur la fatigue, le mal de mouvement et les difficultés d'exécuter les tâches, le tout lié aux mouvements des navires dans l'environnement navire. Le QEP a été déployé sur sept navires de la Force navale permanente de l'Atlantique (STAVFORLANT) lors d'entraînement au combat effectué en 1997. La base de données qui en découle contient plus de 16 500 réponses aux sections « Symptômes » et « Performance » du QEP, qui comptaient 41 paramètres. Le présent document décrit les teneurs et format de la version 1 de la base de données QEP et les fichiers connexes.

This page intentionally left blank.

Executive Summary

Introduction

The requirement to reduce the size of crews on modern warships, while at the same time coping with naval tasks which are becoming more complex, has increased the importance of understanding *issues* which *degrade* human performance in the naval environment. The NATO Performance Assessment Questionnaire (PAQ) was developed to examine the effects of ship motions on fatigue, motion sickness and naval task performance. The questionnaire was deployed on seven ships of the NATO Standing Naval Forces Atlantic fleet (STANAVFORLANT), during two weeks of winter combat exercises in the North Atlantic.

Results

Over 1000 PAQ booklets were returned from the seven frigates and destroyers involved in this project. The resulting PAQ database contains over 16,500 completions of the 41-parameter 'Symptoms' and 'Performance' sections of the PAQ. Two of the more important conclusions from database analysis are: the highly significant correlation between fatigue and cognitive performance problems is at least partly influenced by ship motion effects on sleeping; and, low or 'background' levels of motion sickness are associated with serious performance problems on both cognitive and physical tasks. Many other important issues of practical and theoretical interest are also identified.

Significance

The PAQ database is a unique source of information on the types and severity of naval task performance problems, and for examining potential causal relationships between ship motions, fatigue, motion sickness, and task performance problems. The database will provide guidance on establishing priorities for future R&D on human performance, and also enables development of new modeling and simulation tools.

Colwell, J.L. 2001. NATO Performance Assessment Questionnaire (PAQ) Database. DREA TM 2001-151. Defence Research Establishment Atlantic.

Sommaire

Introduction

Le besoin de réduire le nombre des membres d'équipage sur les navires de guerre modernes alors que les activités navales, qui deviennent de plus en plus complexes, doivent toujours être accomplies a augmenté l'importance qu'il y a de comprendre ce qui diminue la performance humaine dans l'environnement des navires. Le questionnaire d'évaluation de performance (QEP) de l'OTAN a été conçu pour dresser une base de données sur la fatigue, le mal de mouvement et les difficultés d'exécuter les tâches, le tout lié aux mouvements des navires dans l'environnement navire. Le QEP a été déployé sur sept navires de la Force navale permanente de l'Atlantique (STAVFORLANT) lors d'entraînement au combat effectué en 1997.

Résultats

Plus de 1 000 livrets sur le QEP ont été reçus des frégates et des destroyers qui ont participé au projet. la base de données QEP qui en résulte contient plus de 16 500 réponses complètes des sections à 41 paramètres du QEP, intitulées « Symptômes » et « Performance ». Deux des plus importantes conclusions émanant de l'analyse de la base de données sont : la corrélation très significative qui existe entre la fatigue et les problèmes de performance cognitive est pour le moins causée par les effets des mouvements du navire sur le sommeil et le faible niveau ou le niveau de fond du mal de mouvement est lié aux problèmes de performance dans les tâches aussi bien cognitives que physiques. De nombreuses autres questions importantes d'intérêt pratique et théorique sont aussi déterminées.

Portée

La base de données QEP est une source unique d'information sur le type et la sévérité des problèmes lés à la performance de tâches navales et pour examiner les relations causales possibles entre les mouvements des navires, la fatigue, le mal de mouvement et les problèmes d'exécution des tâches. La base de données servira de guide quant à établir des priorités pour les travaux de R-D visant la performance humaine et facilitera la réalisation de nouveaux outils de modélisation et de simulation.

Colwell, J.L. 2001. NATO Performance Assessment Questionnaire (PAQ): Database. DREA TM 2001-151. Defence Research Establishment Atlantic.

Table of Contents

Abstract i

Résumé i

Executive summary iii

Sommaire iv

Table of Contents v

List of Tables vi

List of Annex Figures vi

Acknowledgements vii

1 Introduction 1

2 Overview of Database 2

2.1 Distribution Disk and Installation 3

2.2 Ship and Subject ID Codes 4

3 Data Files 4

3.1 PAQ Responses 4

3.1.1 Response Scores and Null Responses 6

3.2 Ship Motion File 6

4 Analysis Files 7

4.1 Subject Groups 7

4.2 Other Analysis Files 8

4.2.1 Problem Severity 9

4.2.2 Correlation 9

4.2.3 Per-Subject Average Severity 9

4.2.4 Severity Response Counts 10

5 Conclusion 11

References 12

Notation 13

Annex: Sample File Contents and Formats 14

P516767.PDF [Page: 11 of 36]

List of Tables

Table 1	PAQ Response File Parameter List	5
Table 2	Ship Motion File Parameters	6
Table 3	Subject Groups and Generic File Names	7

List of Annex Figures

Figure A.1.a	Database File, Text Editor View	13
Figure A.1.b	Database File, Spreadsheet View	13
Figure A.2.a	Ship Motions File, Text Editor View	14
Figure A.2.b	Ship Motions File, Spreadsheet View	14
Figure A.3.a	Subject Group File, Text Editor View	15
Figure A.3.b	Subject Group File, Spreadsheet View	15
Figure A.4.a	Problem Severity File, Text Editor View	16
Figure A.4.b	Problem Severity File, Spreadsheet View	16
Figure A.5.a	Correlation File, Text Editor View	17
Figure A.5.b	Correlation File, Spreadsheet View	17
Figure A.6.a	Per-Subject Average Severity File, Text Editor View	18
Figure A.6.b	Per-Subject Average Severity File, Spreadsheet View	18
Figure A.7.a	Response Count File, Text Editor View	19
Figure A.7.b	Response Count File, Spreadsheet View	19

Acknowledgements

The author thanks all members of STANAVFORLANT who participated in this project, and assures them that their input is an important contribution to naval science. Gratitude is extended to SACLANT and his staff for providing access to the fleet, and to Canadian Forces Maritime Command for their assistance. Special thanks to the 'ABCD working group' for their continuing guidance and spirited discussions on what should, and should not, be in the PAQ (and what does it mean, anyway?), and to the many people at TNO (Netherlands) and Dalhousie University (Canada) for their help in producing the PAQ translations. Finally, thanks to Mr. Ed Brunt, at DREA, without whose technical support this trial would probably not have been successful, and to my three children, Trevor, Jordan, and Megan, who drove the three extra staples through each of the 1707 PAQ booklets.

1.0 Introduction

The NATO Performance Assessment Questionnaire (PAQ), was developed as an instrument for obtaining a large database on fatigue and motion sickness (MS) symptoms, and task performance problems associated with ship motions, as experienced during naval operations. This database will be used in two general ways:

1. to define the types and severity of task performance problems encountered in the naval environment - this will help provide guidance for setting future priorities on human performance research, development and engineering activities; and,

2. to examine correlation between task performance problems and associated fatigue and motion sickness symptoms, to determine if statistical estimators can be developed for ship design and operational guidance (at present, no analytical models exist for this purpose).

The PAQ also includes a few "other" problems on health and environmental issues (e.g. cold/flu, noise, lighting, etc.) which may identify possible relationships between task performance problems and environmental or operating procedures which are specific to individual ships.

The PAQ was deployed on seven frigates and destroyers in the NATO Standing Naval Forces Atlantic fleet (STANAVFORLANT), in February and March of 1997, during two weeks of intense, multi-theatre combat exercises. The fleet operated over a wide area off the Northwest coast of the United Kingdom, including both sheltered and unsheltered areas. Significant wave heights exceeding 9 metres with sustained average wind speeds of up to 60 knots were encountered. A total of 1026 PAQ booklets were completed and returned. The resulting PAQ database contains over 16,500 completions of the 41-parameter 'Symptoms' and 'Performance' sections of the questionnaire.

The types and severity of reported problems and key correlation between ship motions, fatigue, motion sickness and task performance are summarized in Reference 1, which focuses on a sub-set of 19 of the 41 PAQ parameters. Reference 2 describes the PAQ project and deployment on STANAVFORLANT, documents the PAQ as deployed in five languages, and provides details on the number and reliability of PAQ responses. Reference 3 provides detailed information on problem severity and correlation for all 41 PAQ parameters.

This Technical Memorandum documents the contents and format of the PAQ database and related analysis files, distributed as version 1.

2.0 Overview of Database

The PAQ database, version 1, described in this Technical Memorandum includes the following six individual types of files, arranged in two categories; data files and analysis files.

Data files

- PAQ responses
- ship motions

Analysis files

- subject groups
- problem severity
- correlation
- per-subject average severity
- response counts

The first two 'data file' types contain data obtained on the questionnaire and from measurements during the STANAVFORLANT deployment. The remaining five 'analysis file' types contain information subsequently generated during data analysis [1,2,3]. The actual 'database', comprising the questionnaire responses, is contained in the PAQ response files. The subject group files classify personnel according to reported motion sickness (MS) symptoms, and according to task, as discussed in Section 4.1. The problem severity and correlation files contain the actual numeric data published in the detailed problem severity and correlation annex tables of Reference 3. The per-subject average severity and response count files contain additional information produced during the analysis process.

The data contained in the PAQ response and ship motion data files are sufficient to replicate all information in the analysis files, following the analysis procedure documented in References 2 and 3. Alternately, these data files permit re-examination of problem severity and correlation trends using different assumptions or methods. Inclusion of the analysis files with this database distribution allows detailed examination of particular data sub-sets and report generation using other techniques, without having to re-analyze the original data.

The remainder of this overview section describes the database distribution disk contents and installation, including file naming conventions, and the definition of ship and subject ID codes. Later sections describe the contents and format of the different file types. The Annex illustrates sample file contents and formats for both 'text editor'[1] and spreadsheet[2] program views.

[1] WinEdit 99 Copyright © Steve Schauer, Morrie Wilson 1990 - 1999
[2] Microsoft® Excel 2000 Copyright © 1985 - 1999 Microsoft Corporation

2.1 Distribution Disk and Installation

The PAQ database and related files are distributed on a single 2 MB PC floppy disk as a self-extracting, compressed file[3], called **`PAQ-v01.exe`**, which is a Microsoft® Windows® executable program.

The recommended installation procedure creates a PAQ directory (or folder) which contains six sub-directories and 171 files. The amount of disk space required for the PAQ database is approximately 5.8 MB, but can vary slightly according to the computer's file system. Subsequent sections assume that the following recommended PC installation procedure is used.

After installation, all database files are comma-delimited, ASCII text, with carriage-return/ linefeeds (i.e. plain text with line breaks).

Recommended PC installation procedure

1. insert the write-protected PAQ distribution floppy disk into the floppy drive
   - assume **`a:`**
2. check **`a:`** for viruses and related problems
   - assume none present
3. verify the size of **`PAQ-v01.exe`** is 785,408 bytes.
4. copy **`PAQ-v01.exe`** from **`a:`** to a temporary directory on a hard drive
   - assume **`C:\temp\PAQ-01.exe`**
5. remove the PAQ distribution floppy disk from **`a:`**
6. run **`C:\temp\PAQ.exe`**
7. select 'Unzip' from the resulting 'WinZip Self-Extractor' dialog window
8. delete **`PAQ-v01.exe`** from the hard drive.

This procedure will produce the following folder and file structure.

`C:\PAQ\`	! no files,	6 sub-directories
`C:\PAQ\correlation\`	! 14 files:	531,258 bytes
`C:\PAQ\data\`	! 8 files:	2,477,622 bytes
`C:\PAQ\perSubject\`	! 37 files:	1,231,420 bytes
`C:\PAQ\problemSeverity\`	! 37 files:	402,486 bytes
`C:\PAQ\responseCounts\`	! 37 files:	979,279 bytes
`C:\PAQ\subjectGroups\`	! 37 files:	12,444 bytes

[3] WinZip® 8.0 and WinZip® Self Extractor 2.2 Copyright © 1995-2001 WinZip Computing, Inc.

2.2 Ship and Subject ID Codes

Two types of randomly-assigned identification (ID) codes are used in the PAQ database; ship ID codes, and subject ID numbers.

Each of the seven ships in the PAQ database has an alphabetic code letter, ranging from A through G. These letter codes are used in computer file names described below, and were used to label the detailed problem severity and correlation tables reported elsewhere [3]. The numeric equivalents of the letter codes, ranging from A = 1 through G = 7, are used within the PAQ response files to provide all-numeric data.

During the collection of PAQ booklets from the STANAVFORLANT ships, each booklet was assigned a unique ID code consisting of the ship's alphabetic code letter, and a sequentially-assigned number, beginning with one for each ship. Since the booklets were drawn at random from unsorted boxes, these numbers also serve as the subject ID codes. Information from the 'Personal Information' section of the questionnaire are not included in this database, and so it is not possible to associate database responses with particular individuals who completed the questionnaire.

3.0 Data Files

3.1 PAQ Response Files

The database of questionnaire responses is contained in the PAQ response files, which are located in the `C:\PAQ\data\` directory. Each file name is of the form: `X_data.dat`, where `X` is the ship ID letter code.

Figures A.1.a and A.1.b in the Annex show sample data at the beginning of the PAQ response file for Ship D. Figure A.1.a shows a text-file view, in which the comma delimiters are visible, while Figure A.1.b shows the same data as input to a spreadsheet program, for which the comma delimiters define columns. The first line of a PAQ response file contains alphabetic labels, and each subsequent row contains numeric data for the forty-five parameters listed in Table 1. The first two columns in Table 1 show the column number, N_C, and equivalent spreadsheet alphabetic column label, A_C, for each parameter in a single row of the file. The third column of Table 1 shows the parameter number, N_P, used previously [3] to identify the 'Symptoms' and 'Performance' section parameters, followed by each parameter's name (as used in the first row of the file), its general description, and response scale or range of values.

Table 1: PAQ Response File Parameter List

N_C	A_C	N_P	Name	Description	Scale
1	A	-	ship	Ship ID Number	1 - 7
2	B	-	subject	Subject ID Number	1, Ns
3	C	-	day	Day of Trial	0 - 12
4	D	-	time	Time of Day	0001 - 2400
5	E	1	SLqual	Sleep Quality	0 - 3
6	F	2	SLtime	Sleep Time	0 - 3
7	G	3	SLmotn	Sleep Motions	0 - 3
8	H	4	SLmsi	Sleep MS	0 - 3
9	I	5	SLother	Sleep (other)	0 - 3
10	J	6	Mfatig	Mental Fatigue	0 - 3
11	K	7	Pfatig	Physical Fatigue	0 - 3
12	L	8	sleepy	Sleepy	0 - 3
13	M	9	head	Headache	0 - 3
14	N	10	apathy	Apathy	0 - 3
15	O	11	tension	Tension	0 - 3
16	P	12	vomit	Vomit	0 - 3
17	Q	13	nausea	Nausea	0 - 3
18	R	14	stomach	Stomach Awareness	0 - 3
19	S	15	SYother	Symptom (other)	0 - 3
20	T	16	SS	Seasickness Scale	0 - 10
21	U	17	MSmeds	MS Medicine	0 - 1
22	V	18	decison	Decision Making	0 - 3
23	W	19	concen	Concentration	0 - 3
24	X	20	memory	Memory	0 - 3
25	Y	21	simple	Simple Tasks	0 - 3
26	Z	22	balance	Balance	0 - 3
27	AA	23	carry	Carrying / Moving	0 - 3
28	AB	24	hand	Hand Coordination	0 - 3
29	AC	25	vision	Vision	0 - 3
30	AD	26	TPother	Performance (other)	0 - 3
31	AE	27	mistake	More Mistakes	0 - 1
32	AF	28	longer	Longer Time	0 - 1
33	AG	29	notFin	Not Finished	0 - 1
34	AH	30	abandon	Abandoned	0 - 1
35	AI	31	notDo	Not Attempt	0 - 1
36	AJ	32	TCother	Completion (other)	0 - 1
37	AK	33	coldFlu	Cold - Flu	0 - 3
38	AL	34	airQual	Air Quality	0 - 3
39	AM	35	noise	Noise	0 - 3
40	AN	36	vibratn	Vibration	0 - 3
41	AO	37	bright	Too Bright	0 - 3
42	AP	38	dark	Too Dark	0 - 3
43	AQ	39	hot	Too Hot	0 - 3
44	AR	40	cold	Too Cold	0 - 3
45	AS	41	OPother	Other (other)	0 - 3

Each row of data in a PAQ response file corresponds to a 'questionnaire completion', as defined and discussed in previous documents [2,3]. The first four parameters in each row provide a unique ship/subject/day/time identifier for each questionnaire completion. Day 1 is February 25, 1997.

3.1.1 Response Scores and Null Responses

As shown in Table 1, most of the PAQ parameters are scored on a four-point scale, with checkboxes to select responses from zero through three; corresponding to none through severe. The sea sickness (SS) scale is scored on an eleven-point scale (0 through 10) and other parameters are scored on a two-point, yes/no scale, where no is zero, and yes is one. In addition to these 'expected' or allowed scores, any particular response (other than the ship or subject ID codes) may have a numeric value of -1, to indicate a null response, where the subject did not provide any input. The null response is different than selecting zero, as discussed in [2] and [3].

For PAQ analysis and reporting to date [1,2,3], any rows of data with a null response in the time or date fields were excluded, whereas null responses in the remaining 41 parameters could be either included [1] or excluded [3], and have been incorporated in a measure of the reliability of responses [2].

3.2 Ship Motion File

The 12-hour averaged RMS ship motions for Ship D are held in file `d_motions.dat`, which is located in the `C:\PAQ\data\` directory.

Table 2 shows the column number, Nc, label, description and units for each column, or record of data, and Figures A.2.a and A.2.b show sample data for text-file and spreadsheet views.

Table 2: Ship Motion File Parameters

N_C	Label	Description	Units
1	Day	day of trial (1.5 through 10.5)	day
2	V.Accn	RMS vertical acceleration at centre of gravity	m/s^2
3	Pitch	RMS pitch angle	degrees
4	L.Accn	RMS lateral acceleration at centre of gravity	m/s^2
5	Roll	RMS roll angle	degrees

4.0 Analysis Files

4.1 Subject Groups

Table 3 shows the seven types of subject groups and their generic file names.

Table 3: Subject Groups and Generic File Names

N_G	Subject Group	Subject File Name
1	all subjects	`X_all.sub`
2	no MS	`X_MS_none.sub`
3	any MS	`X_MS_any.sub`
4	- low MS	`X_MS_low.sub`
5	- high MS	`X_MS_high.sub`
6	cognitive	`X_cognitive.sub`
7	physical	`X_physical.sub`

where: N_G is the subject group number (used later in computer file names);
`X` is the ship ID code letter; and,
MS is Motion Sickness.

The first five subject groups are defined for all seven ships, and the last two are only defined for Ship D, giving a total of thirty-seven subject group files in directory `C:\PAQ\subjectGroups\`.

The first group contains all subjects who returned valid questionnaires on each ship. As discussed below, this group does not necessarily include every subject who returned a PAQ booklet.

The second through fifth subject groups, N_G = 2 through 5, are defined by subject responses to the three motion sickness (MS) parameters; 'vomit', 'nausea', and 'stomach awareness'. Subjects who reported no problems with any of these symptoms throughout the entire trial are in the 'no MS' group; all others are in the 'any MS' group. The 'low' and 'high MS' groups are the lower and higher 50th percentiles of the 'any MS' group. As discussed elsewhere [1,3] subjects in the high MS group are not necessarily *highly susceptible* to motion sickness.

For the last two subject groups, N_G = 6 and 7, subjects are assigned to either the cognitive or physical subject group, according to the primary character of their usual tasks [3].

Each subject group file begins with a single-line description which defines the ship and subject group, followed by the subject ID numbers of each member of the subject group, one per line. Figures A.3.a and A.3.b show sample data from the start of the 'all subjects' file for Ship D. Note that 'Subject 12' does not appear in this file. As mentioned in Section 3.1.1, all questionnaire completions with a null response for the day or time are excluded from subsequent analysis. The PAQ response file `d_data.dat` contains twenty separate questionnaire completions for Subject 12, but every completion has a null response for time, and so none of these records are included in subsequent analysis and reporting. Reference 2 quantifies null responses for all ships and PAQ parameters.

4.2 Other Analysis Files

The remaining types of analysis files are named using the following syntax, which was also used to label Annex tables in Reference 3.

file name: `X-`N_F`-`N_G`.dat`

where, '`X`' is the ship ID code letter,

'N_F' is the file-type number:

N_F = 1, problem severity
2, correlation, current motions
3, correlation, past motions
4, per-subject average severity
5, response counts; and,

'N_G' is the subject group number (see Table 3),

N_G = 1, all subjects
2, no MS group
3, any MS group
4, low MS group
5, high MS group
6, cognitive tasks (Ship D only)
7, physical tasks (Ship D only)

For example, the name of the computer file containing problem severity analysis information for subjects in the 'no MS' group on Ship E is: `E-1-2.dat`.

The "correlation, past motions" case examines correlation between sleep problems reported in the current 12-hour period with motions measured in the previous 12-hour period, which should be representative of conditions during the time when the sleep problems were experienced [3].

4.2.1 Problem Severity

Thirty-seven problem severity files, one for each subject group on every ship, are located in directory `C:\PAQ\problemSeverity\`. Figures A.4.a and A.4.b in the Annex show sample file structure and contents for the 'all subjects' group on Ship D. Following file naming syntax described above, the name of this file is `D-1-1.dat`.

Each problem severity file is arranged as a matrix with 20 columns and 42 rows. The first row contains 'day of trial' labels for days 1.5 through 10.5 (i.e. 12-hour intervals). The term 'WSmax' at the start of this row denotes that data in this file are expressed as percent of maximum Weighted Severity (WS) [1,3].

The second and subsequent rows contain calculated problem severity data for each 19 half-day time interval across columns, and sequential rows list the parameters using the same parameter names and order as shown in Table 1, for N_P = 1 through 41.

4.2.2 Correlation

Directory `C:\PAQ\correlation\` holds fourteen correlation files for Ship D; seven files for correlation with current motions (`D-2-`N_G`.dat`), and seven for correlation with past motions (`D-3-`N_G`.dat`), where N_G varies from 1 through 7 in both cases, for the seven subject groups defined earlier. Figures A.5.a and A.5.b in the Annex show sample file structure and contents for a small portion of the Ship D 'all subjects' group.

Each correlation file is arranged as a matrix with 46 columns and 93 rows, which contain correlation data for each combination of the 4 ship motions (see Table 2) and 41 PAQ parameters (see Table 1). The first row in a correlation file defines the parameter labels, followed by a pair of rows for each parameter; the first row with Pearson correlation coefficient 'r' values, and the next row with the corresponding statistical significance 'p-level'.

4.2.3 Per-Subject Average Severity

Thirty-seven per-subject average severity files, one for each subject group on every ship, are in the `C:\PAQ\perSubject` directory. Figures A.6.a and A.6.b show sample data views from the start of the 'all subjects' group for Ship D. The first row contains the PAQ parameter name labels, followed by one row of data per member of the subject group, beginning with the subject ID number, and followed by that subject's average severity score on each of the PAQ parameters.

For each subject, the average severity score is simply the sum of numerical responses to that parameter (i.e. the response scales defined in Table 1), divided by the number of PAQ responses from the subject. These data are different from the weighted severity (WS) scores used in problem severity files (see Section 4.2.1). The WS score is a measure of problem severity for a group of subjects, while the per-subject average severity is only for individuals.

The data in these files have not been previously reported. These files were generated during PAQ analysis to define the subject groups based on motion sickness (MS) responses. This process can be replicated by sorting the data in the 'all subjects' file on the basis of response to the vomit, nausea and stomach awareness parameters. Alternately, the user can develop new subject groups by sorting and separating sub-groups using per-subject average severity responses to other parameters.

4.2.4 Severity Response Counts

Thirty-seven problem severity files, one for each subject group on every ship, are located in directory `C:\PAQ\responseCounts\`. Figures A.7.a and A.7.b in the Annex show sample file structure and contents for the 'all subjects' group on Ship D.

Each problem severity file is arranged as a matrix with 21 columns and 199 rows. The first row identifies columns, including 'day of trial' labels for days 1.5 through 10.5 (i.e. 12-hour intervals). Subsequent data are arranged in groups of rows. The first row of a group shows the name of the parameter in the first column. In every row, the second column shows the score value for which response counts are tabulated across the remainder of that row. The first row of a group lists counts for 'null responses' (-1), and subsequent rows show the scores for the range of responses for the parameter, ranging from '0' (zero) to the maximum score for the parameter, see Table 1. For example, Figures A.7.a and A.7.b show that on day 2.5, a total of 42 subjects responded with a score of '1' (i.e. a mild problem) for 'SLqual', or 'Problems with Sleep Quality'.

The data in these files have not been previously reported. These files were generated during PAQ analysis to calculate weighted severity (WS) scores [3]. These data allow the user to easily calculate different types of severity scores than defined in [3], and to examine the distribution of response values.

5.0 Conclusion

The main goals for the PAQ were accomplished. A large database of fatigue, motion sickness and task performance problems associated with ship motions in the naval environment has been obtained.

The contents and format of the PAQ database, version 1 distribution, were described in detail. The database includes responses over ten days to the 41 'Symptoms' and 'Performance' sections of the questionnaire, for all subjects returning questionnaire booklets from all seven ships in the STANAVFORLANT deployment.

Two types of files are included in this database distribution: 'data files', which contain responses and measurements made during the deployment; and, 'analysis files', which contain processing output on problem severity, correlation, subject groups, and other types of tabular response data. These files allow a user to replicate PAQ analysis procedures reported elsewhere, as discussed in the text, or to implement different categorization or analysis strategies.

References

1. Colwell,J.L. 2000. NATO Questionnaire: Correlation Between Ship Motions, Fatigue, Sea Sickness and Naval Task Performance. *Transactions of Human Factors in Ship Design and Operation*, Royal Institution of Naval Architects, London.

2. Colwell, J.L. 2000. NATO Performance Assessment Questionnaire (PAQ): PAQ Project, Questionnaire Design and Reliability of Responses. DREA TM 2000-141. Defence Research Establishment Atlantic, Canada.

3. Colwell, J.L. 2000. NATO Performance Assessment Questionnaire (PAQ): Problem Severity and Correlation for Ship Motions, Fatigue, Seasickness and Task Performance. DREA TM 2000-142. Defence Research Establishment Atlantic, Canada.

4. Wertheim, A.H. *et al.* 1992. Incidence and Severeness of Sea-Sickness: Validation of a Rating Scale (TNO Report IZF 1992 A-41). Institute for Human Perception, Netherlands.

Notation

Ac	alphabetic column label: A - Z; then AA - AZ; etc.
ABCD	American, British, Canadian, and Dutch
MB	mega byte, 1 MB = 1024 KB = 1024 x 1024 bytes
MS	motion sickness
Nc	column number
Nf	file-type number
Ng	subject group number
Np	parameter number (Np = 1, 41)
Nr	row number
NATO	North Atlantic Treaty Organization
p	p-level, statistical significance
PAQ	Performance Assessment Questionnaire
RMS	Root Mean Square, descriptive statistic
SS	Seasickness Scale, a simplified 'Misery Scale' [4]
STANAVFORLANT	Standing Naval Forces Atlantic (NATO fleet)
r	Pearson linear correlation coefficient
WS	Weighted Severity score [3]
x	denotes ship ID code letter in computer file name[1]

[1] **Bold-faced, Courier-font text identifies computer file and directory names.**

Annex: Sample File Contents and Formats

d_data.dat

```
ship, subject, day, time, SLqual  , SLtime  , SLmotn  , SLmsi
4, 1, 2, 1150, 1, 2, 1, -1, 3, 2, 2, 2, 2, 3, 1, 0, 0, 0, -1, 2
4, 1, 2, 2300, 0, 0, -1, -1, -1, 2, 1, 3, 1, 0, 1, 0, 0, 0, 3,
4, 1, 3, 1200, 2, 2, 0, 0, 0, 1, 1, 2, 0, 0, 1, 0, 0, 0, 0, 0,
4, 1, 3, 2350, 2, 3, 2, 0, 3, 3, 3, 3, 3, 2, 3, 0, 3, 3, 0, 10,
4, 1, 4, 1200, 2, 1, 2, 0, 0, 2, 3, 3, 2, 0, 1, 0, 0, 1, 0, 7,
4, 1, 4, 2330, 2, 2, 2, 0, 3, 1, 1, 1, 0, 0, 1, 0, 0, 0, 0, 1,
4, 1, 5, 1200, 1, 0, 2, 0, 3, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 1,
4, 1, 5, 2330, 0, 0, 0, 0, 0, 1, 2, 1, 0, 1, 1, 0, 0, 0, 0, 3,
4, 1, 6, 1200, 3, 2, 3, 2, 0, 1, 3, 2, 1, 3, 2, 0, 1, 1, 0, 9,
4, 1, 6, 2330, 3, 2, 3, 2, 0, 2, 3, 3, 1, 3, 2, 0, 2, 2, 0, 9,
4, 1, 7, 1200, 2, 2, 2, 0, 0, 3, 2, 2, 1, 2, 2, 0, 0, 0, 0, 7,
4, 1, 8, 1200, 1, 0, 0, 0, 0, 2, 1, 1, 1, 1, 1, 0, 0, 0, 0, 5,
4, 1, 8, 2330, 2, 1, 2, 0, 0, 1, 2, 1, 1, 1, 1, 0, 0, 0, 0, 6,
4, 1, 9, 1200, 0, 0, 0, 0, 0, 0, 2, 2, 0, 0, 3, 2, 0, 0, 0, 0, 8,
```

Figure A.1.a: PAQ Response File, Text Editor View.

d_data.dat

	A	B	C	D	E	F	G	H
1	ship	subject	day	time	SLqual	SLtime	SLmotn	SLmsi
2	4	1	2	1150	1	2	1	-1
3	4	1	2	2300	0	0	-1	-1
4	4	1	3	1200	2	2	0	0
5	4	1	3	2350	2	3	2	0
6	4	1	4	1200	2	1	2	0
7	4	1	4	2330	2	2	2	0
8	4	1	5	1200	1	0	2	0
9	4	1	5	2330	0	0	0	0
10	4	1	6	1200	3	2	3	2
11	4	1	6	2330	3	2	3	2
12	4	1	7	1200	2	2	2	0
13	4	1	8	1200	1	0	0	0
14	4	1	8	2330	2	1	2	0
15	4	1	9	1200	0	0	0	0

Figure A.1.b: PAQ Response File, Spreadsheet View

d_motions.dat

```
Day, V.Accn, Pitch, L.Accn, Roll
1.5, 0.067, 0.59, 0.097, 2.64
2, 0.163, 0.43, 0.488, 2.29
2.5, 0.162, 0.49, 0.361, 1.56
3, 0.227, 0.54, 0.342, 1.43
3.5, 0.291, 0.57, 0.464, 1.8
4, 0.346, 0.78, 0.395, 1.43
4.5, 0.427, 1.07, 0.703, 2.74
5, 0.292, 0.61, 0.538, 2.32
5.5, 0.512, 1.25, 0.921, 3.63
6, 0.425, 1, 0.679, 2.74
6.5, 0.365, 0.95, 0.659, 2.64
7, 0.24, 0.6, 0.529, 2.21
7.5, 0.53, 1.31, 0.6, 2.17
8, 0.42, 1.19, 0.877, 3.61
```

Figure A.2.a: Ship Motions File, Text Editor View.

d_motions.dat

	A	B	C	D	E
1	Day	V.Accn	Pitch	L.Accn	Roll
2	1.5	0.067	0.59	0.097	2.64
3	2	0.163	0.43	0.488	2.29
4	2.5	0.162	0.49	0.361	1.56
5	3	0.227	0.54	0.342	1.43
6	3.5	0.291	0.57	0.464	1.8
7	4	0.346	0.78	0.395	1.43
8	4.5	0.427	1.07	0.703	2.74
9	5	0.292	0.61	0.538	2.32
10	5.5	0.512	1.25	0.921	3.63
11	6	0.425	1	0.679	2.74
12	6.5	0.365	0.95	0.659	2.64
13	7	0.24	0.6	0.529	2.21
14	7.5	0.53	1.31	0.6	2.17
15	8	0.42	1.19	0.877	3.61

Figure A.2.b: Ship Motions File, Spreadsheet View

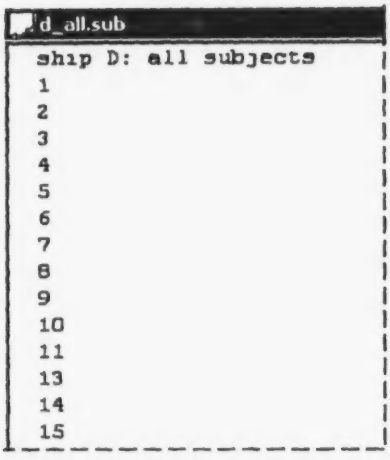

Figure A.3.a: Subject Group File, Text Editor View.

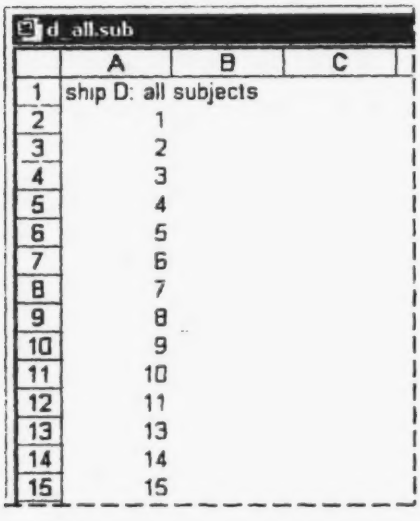

Figure A.3.b: Subject Group File, Spreadsheet View

D 1 1.dat

!WSmax ,	1.5,	2.0,	2.5,	3.0,	3.5,
SLqual ,	18.29268,	26.24113,	22.51656,	29.33333,	17.08333,
SLtime ,	26.01626,	27.42317,	27.37307,	28.66667,	23.95833,
SLmotn ,	6.91057,	11.11111,	6.62252,	12.22222,	9.16667,
SLmsi ,	1.21951,	1.18203,	0.44150,	2.00000,	0.41667,
SLother ,	15.04065,	18.91253,	11.92053,	17.33333,	8.54167,
Mfatig ,	15.44715,	16.07565,	11.92053,	16.22222,	13.12500,
Pfatig ,	20.73171,	19.62175,	16.99779,	19.55556,	17.08333,
sleepy ,	24.39024,	27.89598,	20.52980,	24.00000,	20.41667,
Head ,	10.97561,	10.63830,	11.69978,	9.55556,	13.95833,
apathy ,	8.13008,	7.80142,	7.28477,	10.66667,	10.41667,
tension ,	6.91057,	8.98345,	8.38852,	6.66667,	8.12500,
vomit ,	0.00000,	0.00000,	0.22075,	1.33333,	0.20833,
nausea ,	2.03252,	1.18203,	0.66225,	2.44444,	3.12500,
stomach ,	4.06504,	3.07329,	2.86976,	5.11111,	5.83333,

Figure A.4.a: Problem Severity File, Text Editor View

D 1 1.dat

	A	B	C	D	E	F
1	!WSmax	1.5	2	2.5	3	3.5
2	SLqual	18.29268	26.24113	22.51656	29.33333	17.08333
3	SLtime	26.01626	27.42317	27.37307	28.66667	23.95833
4	SLmotn	6.91057	11.11111	6.62252	12.22222	9.16667
5	SLmsi	1.21951	1.18203	0.4415	2	0.41667
6	SLother	15.04065	18.91253	11.92053	17.33333	8.54167
7	Mfatig	15.44715	16.07565	11.92053	16.22222	13.125
8	Pfatig	20.73171	19.62175	16.99779	19.55556	17.08333
9	sleepy	24.39024	27.89598	20.5298	24	20.41667
10	Head	10.97561	10.6383	11.69978	9.55556	13.95833
11	apathy	8.13008	7.80142	7.28477	10.66667	10.41667
12	tension	6.91057	8.98345	8.38852	6.66667	8.125
13	vomit	0	0	0.22075	1.33333	0.20833
14	nausea	2.03252	1.18203	0.66225	2.44444	3.125
15	stomach	4.06504	3.07329	2.86976	5.11111	5.83333

Figure A.4.b: Problem Severity File, Spreadsheet View

D:\2-1.dat

```
!corr    ,  V.Accn,   Pitch,   L.Accn,    Roll,   SLqual,   SLtime,   SLmotn,
V.Accn   ,   1.000,   0.914,   0.766,   0.434,   0.291,   0.127,   0.551,
   p =   ,   0.000,   0.000,   0.000,   0.063,   0.228,   0.604,   0.015,
Pitch    ,   0.914,   1.000,   0.753,   0.638,   0.221,   0.088,   0.540,
   p =   ,   0.000,   0.000,   0.000,   0.003,   0.363,   0.719,   0.017,
L.Accn   ,   0.766,   0.753,   1.000,   0.775,   0.425,   0.218,   0.678,
   p =   ,   0.000,   0.000,   0.000,   0.000,   0.070,   0.369,   0.001,
Roll     ,   0.434,   0.638,   0.775,   1.000,   0.279,   0.188,   0.545,
   p =   ,   0.063,   0.003,   0.000,   0.000,   0.248,   0.440,   0.016,
SLqual   ,   0.291,   0.221,   0.425,   0.279,   1.000,   0.881,   0.804,
   p =   ,   0.228,   0.363,   0.070,   0.248,   0.000,   0.000,   0.000,
SLtime   ,   0.127,   0.088,   0.218,   0.188,   0.881,   1.000,   0.592,
   p =   ,   0.604,   0.719,   0.369,   0.440,   0.000,   0.000,   0.008,
SLmotn   ,   0.551,   0.540,   0.678,   0.545,   0.804,   0.592,   1.000,
   p =   ,   0.015,   0.017,   0.001,   0.016,   0.000,   0.008,   0.000,
SLmsi    ,   0.478,   0.496,   0.504,   0.479,   0.699,   0.523,   0.808,
   p =   ,   0.038,   0.031,   0.028,   0.038,   0.001,   0.022,   0.000,
```

Figure A.5.a: Correlation File, Text Editor View

D:\2-1.dat

	A	B	C	D	E	F	G	H
1	!corr	V.Accn	Pitch	L.Accn	Roll	SLqual	SLtime	SLmotn
2	V.Accn	1	0.914	0.766	0.434	0.291	0.127	0.551
3	p =	0	0	0	0.063	0.228	0.604	0.015
4	Pitch	0.914	1	0.753	0.638	0.221	0.088	0.54
5	p =	0	0	0	0.003	0.363	0.719	0.017
6	L.Accn	0.766	0.753	1	0.775	0.425	0.218	0.678
7	p =	0	0	0	0	0.07	0.369	0.001
8	Roll	0.434	0.638	0.775	1	0.279	0.188	0.545
9	p =	0.063	0.003	0	0	0.248	0.44	0.016
10	SLqual	0.291	0.221	0.425	0.279	1	0.881	0.804
11	p =	0.228	0.363	0.07	0.248	0	0	0
12	SLtime	0.127	0.088	0.218	0.188	0.881	1	0.592
13	p =	0.604	0.719	0.369	0.44	0	0	0.008
14	SLmotn	0.551	0.54	0.678	0.545	0.804	0.592	1
15	p =	0.015	0.017	0.001	0.016	0	0.008	0
16	SLmsi	0.478	0.496	0.504	0.479	0.699	0.523	0.808
17	p =	0.038	0.031	0.028	0.038	0.001	0.022	0

Figure A.5.b: Correlation File, Spreadsheet View

D : \ d a t

!Nsub,	SLqual ,	SLtime ,	SLmotn ,	SLmsi ,	SLother ,	Mfatig ,
1,	1.56250,	1.18750,	1.33333,	0.28571,	0.80000,	1.62500,
2,	0.69231,	1.30769,	0.50000,	0.00000,	0.75000,	1.08333,
3,	0.00000,	0.00000,	0.00000,	0.00000,	0.00000,	0.00000,
4,	0.37500,	0.70588,	0.23529,	0.00000,	1.71429,	0.58824,
5,	0.05882,	0.23529,	0.05882,	0.00000,	0.11765,	0.05882,
6,	0.73333,	0.80000,	0.73333,	0.06667,	0.42857,	0.06667,
7,	0.26316,	0.47368,	0.36842,	0.00000,	0.05263,	0.00000,
8,	0.27778,	0.05556,	0.33333,	0.00000,	0.00000,	0.05556,
9,	0.33333,	0.22222,	0.27778,	0.00000,	0.05556,	0.00000,
10,	1.05556,	1.00000,	0.83333,	0.05556,	0.17647,	0.44444,
11,	1.00000,	0.94444,	0.53333,	0.00000,	0.00000,	0.83333,
13,	0.22222,	0.22222,	0.33333,	0.00000,	0.00000,	0.55556,
14,	0.12500,	0.12500,	0.00000,	0.00000,	0.00000,	0.00000,
15,	0.20000,	0.30000,	0.00000,	0.00000,	0.00000,	0.10000,
16,	1.70000,	1.10000,	1.66667,	0.00000,	0.50000,	0.60000,
17,	1.18182,	0.90909,	1.12500,	0.00000,	1.75000,	0.68750,

Figure A.6.a: Per-Subject Average Severity File, Text Editor View

D : \ d a t

	A	B	C	D	E	F	G
1	!Nsub	SLqual	SLtime	SLmotn	SLmsi	SLother	Mfatig
2	1	1.5625	1.1875	1.33333	0.28571	0.8	1.625
3	2	0.69231	1.30769	0.5	0	0.75	1.08333
4	3	0	0	0	0	0	0
5	4	0.375	0.70588	0.23529	0	1.71429	0.58824
6	5	0.05882	0.23529	0.05882	0	0.11765	0.05882
7	6	0.73333	0.8	0.73333	0.06667	0.42857	0.06667
8	7	0.26316	0.47368	0.36842	0	0.05263	0
9	8	0.27778	0.05556	0.33333	0	0	0.05556
10	9	0.33333	0.22222	0.27778	0	0.05556	0
11	10	1.05556	1	0.83333	0.05556	0.17647	0.44444
12	11	1	0.94444	0.53333	0	0	0.83333
13	13	0.22222	0.22222	0.33333	0	0	0.55556
14	14	0.125	0.125	0	0	0	0
15	15	0.2	0.3	0	0	0	0.1
16	16	1.7	1.1	1.66667	0	0.5	0.6
17	17	1.18182	0.90909	1.125	0	1.75	0.6875

Figure A.6.b: Per-Subject Average Severity File, Spreadsheet View

D S 1.dat

```
!counts , score,  1.5,  2.0,  2.5,  3.0,  3.5,  4.0,  4.5,  5.0,  5.5,  6.0,
SLqual  ,    -1,    0,    0,    0,    0,    0,    0,    0,    0,    0,    0,
        ,     0,   51,   69,   82,   75,  104,   66,   77,   54,   72,   47,
        ,     1,   19,   41,   42,   32,   37,   33,   35,   44,   43,   36,
        ,     2,   10,   23,   21,   29,   12,   34,   37,   39,   28,   39,
        ,     3,    2,    8,    6,   14,    7,   16,    6,   12,   10,   21,
SLtime  ,    -1,    0,    0,    0,    0,    0,    0,    0,    0,    0,    0,
        ,     0,   36,   64,   73,   73,   88,   61,   73,   64,   72,   50,
        ,     1,   31,   45,   42,   38,   39,   43,   44,   36,   44,   36,
        ,     2,   12,   25,   26,   26,   23,   29,   32,   39,   27,   39,
        ,     3,    3,    7,   10,   13,   10,   16,    6,   10,   10,   18,
SLmotn  ,    -1,    0,    0,    0,    0,    0,    0,    0,    0,    0,    0,
        ,     0,   67,  106,  127,  113,  127,   85,   84,   63,   79,   52,
        ,     1,   13,   24,   19,   23,   23,   37,   32,   38,   38,   30,
        ,     2,    2,   10,    4,   10,    9,   23,   33,   35,   22,   40,
        ,     3,    0,    1,    1,    4,    1,    4,    6,   13,   14,   21,
```

Figure A.7.a: Response Count File, Text Editor View

D S 1.dat

	A	B	C	D	E	F	G	H
1	!counts	score	1.5	2	2.5	3	3.5	4
2	SLqual	-1	0	0	0	0	0	0
3		0	51	69	82	75	104	66
4		1	19	41	42	32	37	33
5		2	10	23	21	29	12	34
6		3	2	8	6	14	7	16
7	SLtime	-1	0	0	0	0	0	0
8		0	36	64	73	73	88	61
9		1	31	45	42	38	39	43
10		2	12	25	26	26	23	29
11		3	3	7	10	13	10	16
12	SLmotn	-1	0	0	0	0	0	0
13		0	67	106	127	113	127	85
14		1	13	24	19	23	23	37
15		2	2	10	4	10	9	23
16		3	0	1	1	4	1	4

Figure A.7.b: Response Count File, Spreadsheet View

UNCLASSIFIED
SECURITY CLASSIFICATION OF FORM
(highest classification of Title, Abstract, Keywords)

DOCUMENT CONTROL DATA

(Security classification of title, body of abstract and indexing annotation must be entered when the overall document is classified)

1 ORIGINATOR (the name and address of the organization preparing the document. Organizations for whom the document was prepared, e.g. Establishment sponsoring a contractor's report, or tasking agency, are entered in section 8.)

Defence Research Establishment Atlantic
PO Box 1012
Dartmouth, Nova Scotia, Canada B2Y 3Z7

2 SECURITY CLASSIFICATION (overall security classification of the document including special warning terms if applicable)

UNCLASSIFIED

3 TITLE (the complete document title as indicated on the title page. Its classification should be indicated by the appropriate abbreviation (S,C,R or U) in parentheses after the title)

NATO Performance Assessment Questionnaire (PAQ) Database

4 AUTHORS (Last name, first name, middle initial. If military, show rank, e.g. Doe, Maj. John E.)

J.L. Colwell

5 DATE OF PUBLICATION (month and year of publication of document)	6a NO. OF PAGES (total containing information. Include Annexes, Appendices, etc.)	6b NO. OF REFS (total cited in document)
September, 2001	29	4

7 DESCRIPTIVE NOTES (the category of the document, e.g. technical report, technical note or memorandum. If appropriate, enter the type of report, e.g. interim, progress, summary, annual or final. Give the inclusive dates when a specific reporting period is covered.)

TECHNICAL MEMORANDUM

8 SPONSORING ACTIVITY (the name of the department project office or laboratory sponsoring the research and development. Include address.)

Defence Research Establishment Atlantic

9a PROJECT OR GRANT NO. (if appropriate, the applicable research and development project or grant number under which the document was written. Please specify whether project or grant.)	9b CONTRACT NO. (if appropriate, the applicable number under which the document was written.)
Project 1gb	

10a ORIGINATOR'S DOCUMENT NUMBER (the official document number by which the document is identified by the originating activity. This number must be unique to this document.)	10b OTHER DOCUMENT NOs. (Any other numbers which may be assigned this document either by the originator or by the sponsor.)
DREA TM 2001-151	

11 DOCUMENT AVAILABILITY (any limitations on further dissemination of the document, other than those imposed by security classification)

(X) Unlimited distribution
( ) Defence departments and defence contractors; further distribution only as approved
( ) Defence departments and Canadian defence contractors; further distribution only as approved
( ) Government departments and agencies; further distribution only as approved
( ) Defence departments; further distribution only as approved
( ) Other (please specify):

12 DOCUMENT ANNOUNCEMENT (any limitation to the bibliographic announcement of this document. This will normally correspond to the Document Availability (11). However, where further distribution (beyond the audience specified in (11) is possible, a wider announcement audience may be selected.)

UNCLASSIFIED
SECURITY CLASSIFICATION OF FORM

UNCLASSIFIED
SECURITY CLASSIFICATION OF FORM
(highest classification of Title, Abstract, Keywords)

13. ABSTRACT (a brief and factual summary of the document It may also appear elsewhere in the body of the document itself It is highly desirable that the abstract of classified documents be unclassified Each paragraph of the abstract shall begin with an indication of the security classification of the information in the paragraph (unless the document itself is unclassified) represented as (S), (C), (R), or (U) It is not necessary to include here abstracts in both official languages unless the text is bilingual)

The NATO Performance Assessment Questionnaire (PAQ) was developed to obtain a large database on fatigue, motion sickness and task performance problems associated with ship motions in the naval environment. The PAQ was deployed on seven ships of the NATO Standing Naval Forces Atlantic fleet (STANAVFORLANT), during North Atlantic combat exercises in February and March of 1997. The resulting PAQ database contains over 16,500 completions of the 41-parameter 'Symptoms' and 'Performance' sections of the PAQ. This Technical Memorandum documents the contents and format of the PAQ database and related files, version 1.

14. KEYWORDS, DESCRIPTORS or IDENTIFIERS (technically meaningful terms or short phrases that characterize a document and could be helpful in cataloguing the document They should be selected so that no security classification is required Identifiers, such as equipment model designation, trade name, military project code name, geographic location may also be included If possible keywords should be selected from a published thesaurus e g Thesaurus of Engineering and Scientific Terms (TEST) and that thesaurus-identified If it not possible to select indexing terms which are Unclassified, the classification of each should be indicated as with the title)

fatigue
sea sickness
task performance
human performance
seakeeping
ship motions
PAQ

UNCLASSIFIED
SECURITY CLASSIFICATION OF FORM